Water Management Plan

United States Environmental Protection Agency
National Health and Environmental Effects Research Laboratory
Western Ecology Division

Corvallis Main Laboratory
200 SW 35th Street
Corvallis, Oregon 97333

27 August 2004

Point of Contact:
Jay Gile
Facilities Manager
541-754-4721

EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HEALTH AND ENVIRONMENTAL RESEARCH LABORATORY
WESTERN ECOLOGY DIVISION
CORVALLIS MAIN LABORATORY

WATER MANAGEMENT PLAN

Approved by:

Jay D. Gile 8-31-04

Jay Gile, Facilities Manager Date

Kathy McBride 8-31-04

Kathy McBride, Associate Director for Program Operations Date

TABLE OF CONTENTS

1.0 EPA'S STATEMENT OF PRINCIPLES ON EFFICIENT WATER USE

In order to meet the needs of existing and future populations and ensure that habitats and ecosystems are protected, the nation's water must be sustainable and renewable. Sound water resource management, which emphasizes careful, efficient use of water, is essential to achieve these objectives.

Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources. As we face increasing risks to ecosystems and their biological integrity, the inextricable link between water quality and water quantity becomes more important. Water efficiency is one way of addressing water quality and quantity goals. The efficient use of water can prevent pollution by reducing wastewater flows, recycling process water, reclaiming wastewater, and using less energy.

EPA recognizes that regional, state, and local differences exist regarding water quality, quantity, and use. Differences in climate, geography, and local requirements influence the water efficiency programs applicable to specific facilities. Therefore, EPA is establishing facility-specific Water Management Plans to promote the efficient use of water and meet the water conservation requirements under Executive Order 13123, Greening the Government Through Efficient Energy Management.

This Water Management Plan has been established to document and promote the efficient use of water at the National Health and Environmental Effects Research Laboratory, Western Ecology Division (WED) Laboratory in Corvallis, Oregon. The plan is organized according to the Federal Energy Management Program (FEMP) Facility Water Management Planning Guidelines under Executive Order 13123.

2.0 FACILITY DESCRIPTION

The main Corvallis research complex is located on 14 acres in Corvallis, surrounded by the Oregon State University campus. It includes a variety of laboratories, plant and animal research facilities, a library, a computer center, and office buildings.

Terrestrial Effects Research Facilities (TERF) within the Corvallis complex includes a number of greenhouse and field research modules. These units provide the capability for research on: 1) effects of gaseous air pollution, 2) effects of heavy metals, 3) effects of toxic substances, and 4) plant propagation and growth assessments. The main laboratory complex also houses a field exposure facility with 21 large open-top exposure chambers, a nursery site, an automated irrigation system, an experimental rhizotron site, and a control center containing automated pollutant delivery-control and data-acquisition/management systems.

To complement the plant exposure facilities described above, WED constructed a highly sophisticated Terrestrial Ecophysiology Research Area (TERA) in 1994. The facility consists of a large polyhouse to shelter the data acquisition and control computers, and a field of sunlit plant growth chambers. Ambient temperature, dewpoint, and CO_2 concentration in each outdoor enclosure are carefully controlled by programmable microprocessors. These facilities are used to conduct long-term studies on conifers and hardwoods, with experiments designed to evaluate the response of forests to climate change.

The main laboratory building was built in 1966 and operated by the U.S. Public Health Service, before being transferred to EPA when the Agency was established in 1970. The research complex has been developed over the years. In addition to the facilities described above, an annex, greenhouses, and office trailers were added in the 1970s. A chemical storage building was added in the 1980s and a plant ecology building was constructed in 1990. The laboratory complex is owned and operated by EPA, and comprises 96,643 square feet of conditioned space.

3.0 FACILITY WATER MANAGEMENT GOALS

The water management goals of WED are achieved through the implementation of an Environmental Management System (EMS). The EMS is being established and implemented consistent with the laboratory environmental management policy. The WED environmental management policy statement is provided below.

Environmental Management Policy

The U.S. Environmental Protection Agency's Office of Research and Development (ORD) mission is to perform state-of-the-art research to identify, understand, and solve current and future environmental problems, provide responsive technical support to EPA's mission, integrate the work of ORD's scientific partners (other agencies, nations, private sector organizations, and academia), provide leadership in addressing emerging environmental issues, and advance the science and technology of risk assessment and risk management.

ORD continues to encourage and set an example of research and development activities which use effective EMSs that focus on regulatory compliance, pollution prevention, resource preservation, and public outreach. With this policy, the National Health and Environmental Effects Research Laboratory - Western Ecology Division joins other ORD sites in committing to implement EMS for our own employees, operations, and facilities. Collectively, ORD will become a leader in executing a model EMS within the Agency.

At WED, we commit to reduce the environmental impacts and consumption of natural resources from our facility operations and comply with all legal and applicable requirements. Our EMS will be designed to meet the following goals:

- Ensure compliance by meeting or exceeding all applicable environmental requirements while conducting research activities;

- Strive to continuously improve environmental performance;

- Integrate source reduction and other pollution prevention approaches into day-to-day research activities;
- Consider the environment when making all planning, purchasing, and operating decisions;
- Establish, track, and review specific environmental performance goals and employee awareness; and
- Share performance information with our research partners and other interested parties.

EMS Water Conservation Objectives

WED has identified the reduction of water consumption as an objective of its draft EMS, which is currently in development. The following targets have been established related to this objective:

- Continue implementation of green landscaping conversion by incorporating trees, shrubs, and other landscape elements that require less irrigation than the existing lawn area.
- Consider water usage in addition to energy usage in the review of HVAC equipment for potential replacement.
- Maintain and promote water conservation awareness through e-mail and posting information.

4.0 UTILITY INFORMATION

Contact Information

Potable water supply and sewer service are provided by:

City of Corvallis
501 SW Madison Avenue
P.O. Box 3015
Corvallis, OR 97339-3015

541-766-6949

Rate Schedule

Monthly water billing is based on a tiered rate structure, provided in Table 1.

Table 1
Water Use Rate Structure

Monthly Rates per Meter			
Meter Size	1.5-inch	2-inch	4-inch
Tier 1 at $1.13/ccf	0 to 67 ccf	0 to 179 ccf	0 to 341 ccf
Tier 2 at $1.40/ccf	Over 67 ccf	Over 179 ccf	Over 341 ccf
Fixed Rate	$23.01	$29.97	$69.52

The Corvallis laboratory has one 1.5-inch meter, two 2-inch meters, and one 4-inch meter, identified in Section 5.0. The sewer use fees for the Corvallis laboratory are based on the water use through the 4-inch meter and one of the 2-inch meters (128770). The tiered rate structure is provided in Table 2.

Table 2
Sewer Use Rate Structure

Monthly amount	Rate per 100 cubic feet (ccf)
0 to 4 ccf	Flat fee of $18.35/month
Over 4 ccf	$2.90

Monthly billing for irrigation water is supplied through an installed ¾-inch meter, and is billed using a three-tiered rate structure, provided in Table 3.

Table 3
Irrigation Water Rate Structure

Monthly amount	Rate per 100 cubic feet (ccf)
0 to 7 ccf	$0.90
8 to 13 ccf	$1.18
Over 13 ccf	$1.57
Fixed Rate	$8.56

The Corvallis laboratory also is billed for storm water drainage at total rate of $387.89 per month.

Payment Office

Research Triangle Park Finance Center (RTP-FC)

(Pouch and Regular Mail)
Environmental Protection Agency
Mail Code - D143-02
Research Triangle Park, NC 27711

(FEDEX)
Environmental Protection Agency
Mail Code - D143-02
4930 Page Road
Research Triangle Park, NC 27711

The fax number for RTP-FC is: 919-541-4975

5.0 FACILITY INFORMATION

The Corvallis laboratory consists of multiple research buildings housing laboratory, office, and sample preparation space. The predominant features are the greenhouses and various field test chambers used to conduct controlled experiments on ecosystem stressors. Water is used as an input for environmental test chambers, landscape irrigation, mechanical systems, sanitary needs, and laboratory processes. Additional details on facility water use are provided in the following sections.

Major Water Using Processes

Estimates of potable water consumption by major use area are provided in Table 4. These data reflect average facility water use between April 2003 and March 2004.

Table 4
Major Water Using Processes

Major Process	Annual Consumption (gallons)	Percent of Total	Comments
TERF - irrigation and evaporative cooling	983,000	10.1	Engineering estimate
TERF - RO system	110,000	1.1	Engineering estimate
TERF - other process water	310,000	3.2	Calculated as remaining difference from metered TERF total
Plant ecology process water	37,000	0.4	Metered
TERA - process water	24,000	0.2	Metered
Main laboratory and annex landscape irrigation and cooling tower make-up	1,900,000	19.5	Engineering estimate
Main laboratory RO system	66,000	0.7	Engineering estimate
Autoclave tempering water	1,600,000	16.4	Engineering estimate from literature values. Flow significantly reduced in June 2004
Single-pass cooling of computer room air conditioner	3,700,000	38.0	Instantaneous measurement
Sanitary water	780,000	8.0	Engineering estimate
Other miscellaneous uses	223,000	2.3	Calculated by difference
TOTAL	9,733,000	100.0	Metered total

Additional detail on assumptions and calculations supporting these water use estimates are provided in Appendix A.

Measurement Devices

Incoming city water is supplied through five separate meters. The meter account numbers and corresponding area serviced by the meter is listed below:

4" Meter 128690 - Main laboratory and annex, including surrounding irrigation
1.5" Meter 128710 - Plant ecology
2" Meter 128720 - TERA
2" Meter 128770 - TERF
¾" Meter 455-380 (Irrigation) - Irrigation around chemical storage building

Metered usage is tracked monthly to monitor trends in water consumption.

Flow totalizing meters are also installed on the make-up water lines to the steam boiler and hot water recycle loop. Make-up water usage is recorded weekly in the O&M contractor's log book. Unexpected changes in make-up water use are investigated and resolved.

Shut-off Valves

Shut off valves are co-located at each meter in the respective below grade meter boxes. Meter box locations are as follows:

Meter 128690 - by sidewalk on 35th Street in front of main laboratory building
Meter 128710 - on east side of plant ecology building
Meter 128720 - on north property line
Meter 128770 - adjacent to southeast corner of TERF building
Meter 455-380 (Irrigation) - adjacent to east side of chemical storage building

Occupancy and Operating Schedules

Approximately 125 employees work at the Corvallis laboratory. The laboratory operates on a flex time schedule and is typically occupied between 6:00 a.m. and 6:00 p.m., Monday through Friday.

6.0 BEST MANAGEMENT PRACTICE SUMMARY AND STATUS

FEMP has identified Water Efficiency Improvement Best Management Practices (BMPs) in 10 possible areas. Implementation of BMPs in four or more areas are required under FEMP guidance. The Corvallis laboratory has adopted and will maintain BMPs in five of the 10 areas, as checked below:

- ✓ Public Information and Education Programs
- ✓ Distribution System Audits, Leak Detection, and Repair
- ✓ Water-Efficient Landscape
- ❑ Toilets and Urinals
- ✓ Faucets and Showerheads
- ✓ Boiler/Steam Systems
- ❑ Single-Pass Cooling Systems
- ❑ Cooling Tower Systems
- ❑ Miscellaneous High Water-Using Processes
- ❑ Water Reuse and Recycling

Additional information related to each BMP area is provided in the following sections.

Public Information and Education Programs (BMP #1)

The Corvallis laboratory promotes water conservation and awareness using the EPA laboratory "Every Drop Counts" water conservation poster series. Conservation posters are displayed in prominent locations within the laboratory. Water conservation pamphlets and fact sheets are included in a lobby display in the main laboratory. In addition, employees will be educated on water and other resource conservation topics though the implementation of laboratory EMS, which is being developed. The reduction of water consumption has been identified as an objective under the draft EMS. In view of this objective, the Facility Manager will maintain and promote water conservation awareness though e-mail and posting information.

Distribution System Audits, Leak Detection, and Repair (BMP #2)

Facility staff are trained to report leaks and malfunctioning water using equipment to a facility maintenance help line. A service request is generated for each reported problem, which is completed by the facility O&M contractor. Service requests are tracked using an internet-based work order management system through completion and close out. O&M contractor staff make a daily walk-through inspection of all mechanical spaces. Any problems or leaks identified are addressed immediately.

A screening level system review was conducted in June 2004 and known water uses account for greater than 90 percent of water consumption.

Water-Efficient Landscape (BMP #3)

The laboratory facility maintains 2.7 acres of irrigated landscaping, half covered with turf and half planted beds. To reduce irrigation water use, the laboratory is working with a landscape architect to convert turf areas to beds planted with shrubs and plants native to the northwest. To date, approximated 0.5 acres of turf have been eliminated through this ongoing project.

Irrigation occurs at night, using multiple zones, each controlled with a separate time clock. During dry periods, irrigation nominally occurs three times per week, and is manually reduced when rain occurs. The irrigation frequency and duration is established to provide the minimum quantity of water necessary to avoid the appearance of stressed vegetation.

The irrigation system is run during daylight hours once every two weeks to inspect for damaged or malfunctioning system components. Any problems identified are immediately corrected.

BMP credit is claimed in this area, in view of the careful irrigation system control, and the ongoing project to reduce the irrigated turf area.

Toilets and Urinals

Construction of the main laboratory occurred in the mid 1960s, with additional construction of ancillary buildings in the 1970s and 1980s. Construction occurred prior to the implementation of current water-efficient sanitary fixture standards. Given the period of building construction, toilets are estimated to operate at 4.5 gallons per flush (gpf) and the one remaining flush urinal at 3.0 gpf, rather than the current low-flow design standards of 1.6 and 1.0 gpf, respectively. Five urinals were recently converted to no-flush design. One urinal was not converted because its full length, floor mount design made conversion impractical. A full inventory of sanitary fixtures is provided in Table 5.

Table 5
Sanitary Fixture Inventory

Fixture	Quantity	Flow Rate
Toilets	17	4.5 gpf
Urinals	1	3.0 gpf
Urinals	5	no-flush
Lavatory Sinks	13	2.2 gpm
Showers	4	2.5 gpm

Janitorial staff and employees are trained to report leaks or other maintenance problems to the facility maintenance help line, which are immediately corrected.

BMP credit is not claimed at this time, pending conversion of the toilets to water efficient design standards.

Faucets and Showerheads (BMP #4)

Table 5 provides an inventory of lavatory faucets and showerheads. The faucets and showerheads were upgraded with water conserving flow restrictors in August 2004.

Janitorial staff and employees are trained to report leaks or other maintenance problems to the facilities maintenance help line, which are immediately corrected.

Boiler/Steam Systems (BMP #5)

Building heat is supplied by two 80 horsepower (hp) hot water boilers. One 80 hp steam boiler is used to supply steam to the autoclaves, and to provide steam to a heat exchanger for domestic hot water production. Steam condensate is collected and returned to the boiler. The boiler water system is monitored and maintained once per month under a service contract to prevent scale and corrosion and optimize condensate reuse. Boiler water quality parameters such as alkalinity, chlorides, hardness, pH, sulfite, total dissolved, and biological growth are monitored and controlled through periodic testing and chemical treatment.

Single-Pass Cooling

Single-pass water is used to cool the air conditioning unit of the computer room in the main laboratory building. This cooling water flow, which runs continuously, presents an opportunity for further water conservation, as discussed in Section 9. BMP credit is not claimed in this area, pending significant reduction or elimination of cooling water flow.

Cooling Tower Systems

The laboratory is equipped with four cooling towers. A 30 ton unit at the Annex was installed in 2003. A 40 ton unit at the TERF was installed when the building was constructed in 1970s. Two 380 ton units are mounted on the roof of the main laboratory; these units are operated in sequence, one each during alternate cooling seasons. Cooling tower blowdown from each tower is controlled manually, based on the recommendations of a cooling tower service contractor. Cooling tower water chemistry is tested monthly for alkalinity, chlorides, pH, total dissolved solids, and phosphonate to control scale and corrosion. BMP credit is not claimed in this area at this time, pending more precise blowdown control achieved by the use of an automatic conductivity meter to control blowdown.

Miscellaneous High-Water Using Processes

De-ionized (DI) water for laboratory use is generated in two systems, one in the main laboratory and the other in the TERF. In each case, DI water is generated through a multi-step process consisting of cartridge filtration, carbon adsorption, and reverse osmosis (RO). Product water from the RO unit is used as feed water to the DI water recirculating loop. The DI water is circulated from a holding tank through an ion exchange bed and ultraviolet disinfection unit and out to the laboratories through a header system. The circulated water that goes unused is returned to holding tank. The RO unit in the main laboratory rejects 0.6 gallons of water for every 0.4 gallons of product water. The RO unit in the TERF is estimated to reject 4.5 gallons of water for every 2.5 gallons of product water.

The main laboratory has a wash room (Room 200) that contains a glassware washer and three autoclaves. A fourth autoclave is located in the adjacent room (Room 202). Tempering water did flow continuously to the discharge drain of each autoclave in Room 200 during the time period reflected by the water balance in Table 4. Tempering water control valves were replaced in July 2004 and now tempering water is only applied when the autoclaves are operating.

The greenhouse at the TERF is divided into four bays, with a central hallway connecting the bays. Each bay is equipped with two evaporative coolers, to cool and humidify greenhouse air during hot weather. The central connecting hallway is also equipped with an evaporative cooler.

No BMP credit is claimed in this area.

Water Reuse and Recycling

No BMP credit is claimed in this area.

7.0 DROUGHT CONTINGENCY PLAN

In the event of a drought or other water supply shortage, the Corvallis laboratory will follow the water use recommendations and restrictions of the City of Corvallis. The city has a Water Supply Emergency Curtailment Plan, available at:

http://www.ci.corvallis.or.us/index.php?option=content&task=view&id=842&Itemid=1249

This plan has four defined response levels:

Stage 1 - Early Warning for a Potential Water Supply Shortage

The Stage 1 warning is reached when maximum daily production is just meeting the daily demand, or when there is expectation of a potential supply deficiency. The City will request that customers voluntarily reduce or eliminate nonessential water use, to follow odd/even outdoor watering schedules based on address, and to limit outdoor watering to the early morning or late evening. The Corvallis laboratory irrigation system already operates at night, three nights per week, and will be operated consistent with Stage 1 requirements.

Stage 2 - Water Supply Shortage

A Stage 2 water shortage is reached when maximum production is not meeting daily demand and reservoir storage falls to 90 percent capacity. The City may ask that customers voluntarily restrict all irrigation and other nonessential outdoor water use.

Stage 3 - Severe Water Supply Shortage

A Stage 3 water shortage is reached when maximum production is not meeting daily demand and reservoir storage falls to 80 percent capacity. All nonessential outdoor water use, including irrigation, is prohibited.

Stage 4 - Critical Water Shortage

A Stage 4 water shortage is reached when maximum production is not meeting daily demand and reservoir storage falls to 60 percent capacity. All nonessential outdoor water use is prohibited. All large industrial and institutional accounts shall restrict water use to fire protection and other critical functions only.

When voluntary or mandatory water use restrictions are instituted by the City of Corvallis under its Water Supply Emergency Curtailment Plan, the requirements are communicated through public announcements. The Facilities Manager will assemble a task force of facility and operating personnel to identify and implement modifications to facility operations to achieve additional specified reductions in water consumption if a Stage 2 or higher water supply emergency is enacted.

8.0 COMPREHENSIVE PLANNING

Consistent with the WED environmental management policy to consider the environment when making all planning, purchasing, and operating decisions, the Facilities Manager will ensure that water supply, wastewater generation, and water efficiency BMPs are taken into account during the initial stages of planning and design for any facility renovations or new construction. These factors will also be considered prior to the purchase and installation of any equipment that would measurably change facility water consumption.

9.0 OPPORTUNITIES FOR FURTHER WATER CONSERVATION

The Corvallis laboratory is considering the following projects to improve measurement and achieve additional reductions in water use:

1) Upgrade Toilets. The laboratory will consider upgrading toilets to low flow design (1.6 gpf). Seventeen toilets could be upgraded. At an installed cost of $500 per fixture, simple payback is estimated to be 7 years at current water rates. Toilet upgrades are estimated to save 230,000 gallons and $1,300 per year.

2) Reduce or Eliminate Single Pass Cooling. Approximately 7 gpm of cooling water is applied continuously to cool the air conditioning unit servicing the computer room in the main laboratory. Several approaches to reducing this water use will be pursued. First, the flow rate will be reduced to the minimum flow recommended by the manufacturer to provide the required amount of heat transfer. Second, the equipment configuration will be examined to determine if the cooling flow can be controlled so that it is applied only when the air conditioner compressor is running. These two steps may significantly reduce the cooling water flow. After the flow rate is minimized, the laboratory will determine if it is cost effective to either supply recirculated chilled water instead of single-pass water to cool the air conditioner, or replace the water-cooled unit with an air-cooled unit. Currently, single-pass cooling is estimated to consume 3,700,000 gallons of water per year, at a cost of $21,000. Significant cost savings and rapid payback is expected in is area.

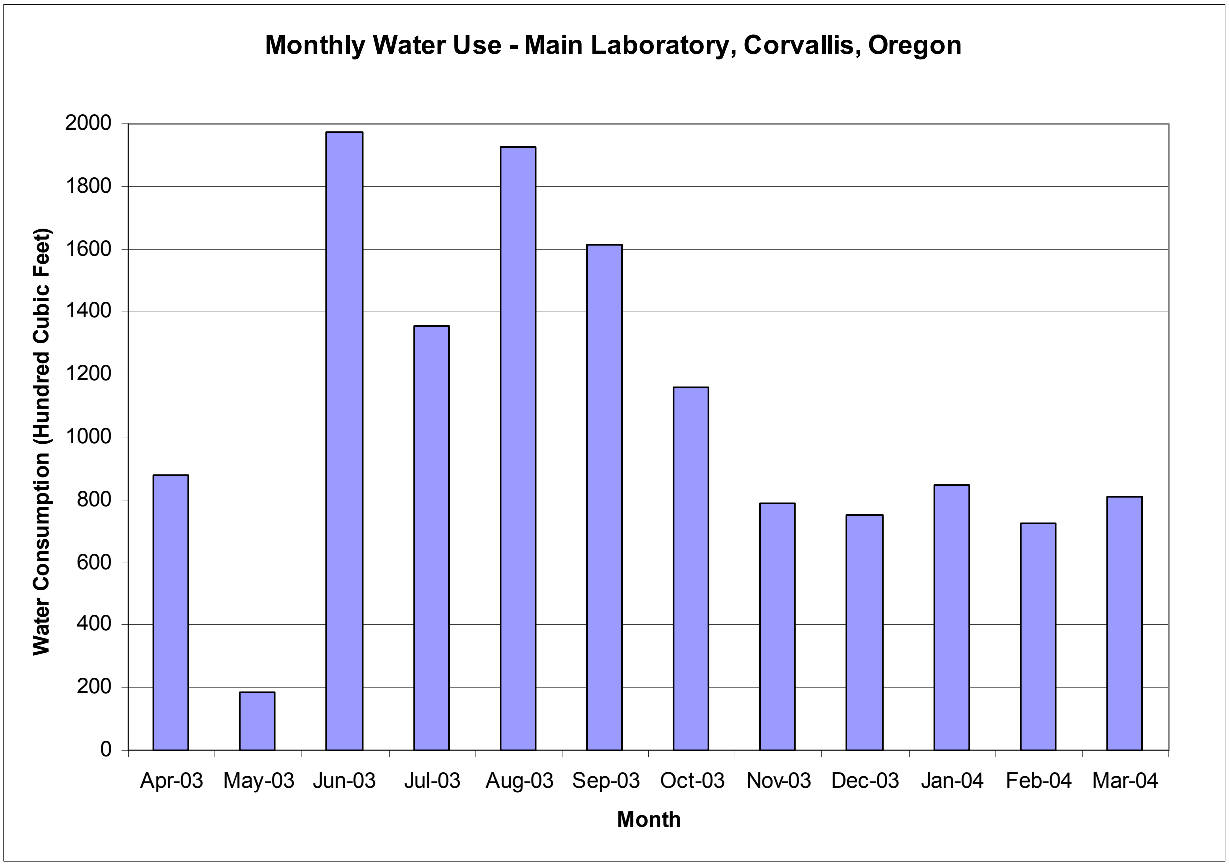
3) Cooling Tower Monitoring and Control. The cooling towers will be equipped with totalizing meters to measure cooling tower make-up water and blowdown water flows. Meter readings will be recorded and tracked at least weekly. The cooling towers will also be equipped with conductivity meters to automatically control blowdown based on a predetermined set point. Each of these changes will allow for more precise cooling tower monitoring and control, and resulting water savings.

Appendix A
Water Use and Water Balance Supporting Calculations

Main Laboratory, Corvallis, Oregon

Major Process	Annual Consumption (gallons)	Supporting Calculations
TERF - irrigation and evaporative cooling	983,000	Use is seasonal. Calculated as the seasonal increase over winter baseline flow for meter 128770. Winter baseline calculated for Nov 03 to March 04 as 47.4 ccf per month, or 569 ccf per year. Total metered consumption is 1,883. 1,883 - 569 = 1,314 ccf. 1,314 ccf * 748 gal/ccf = 982,872 gallons.
TERF - RO system	110,000	Estimated instantaneous flow of 2.5 gpm product and 4.5 gpm reject. System operates 45 min/day, every day. (2.5 + 4.5)gpm * 45 min/day * 365 day/yr = 114,975 gallons
TERF - other process water	310,000	Calculated as baseline use, less RO system use. 569 ccf * 748 gal/ccf -114,975 gallons = 310,637 gallons
Plant ecology process water	37,000	Metered total: 49 ccf * 748 gal/ccf = 36,652 gallons
TERA - process water	24,000	Metered total: 32 ccf * 748 gal/ccf = 23,936 gallons
Main laboratory and annex landscape irrigation and cooling tower make-up	1,900,000	Use is seasonal. Calculated as the seasonal increase over winter baseline flow for meter 128690 plus total from meter 455-380. Winter baseline (meter 128690) calculated for Nov 03 to March 04 as 8,522 ccf per year or 710 per month.. Total metered consumption is 10,433. 10,433 - 8,522 = 1,911ccf. Metered total from meter 455-380 is 611ccf. (1,911+611)ccf * 748 gal/ccf = 1,886,456 gallons.
Main laboratory RO system	66,000	Observed instantaneous flow of 0.4 gpm product and 0.6 gpm reject. System operates 3 hr/day, every day. (0.4 + 0.6)gpm * 60 min/hr * 3 hr/day * 365 day/yr = 65,700 gallons
Autoclave tempering water	1,600,000	Three autoclaves in Room 200 all have constant tempering flow. Assume each has flow of 1 gpm, based on data in Van Gelder paper from Jan. 2004 AWWA Conference. 3 gpm * 60 min/hr * 24 hr/day * 365day/yr = 1,576,800 gallons (Note: control valves replaced in July 2004)
Single-pass cooling of computer room air conditioner	3,700,000	Measured instantaneous flow of 7 gpm. 7 gpm * 60 min/hr *24 hr/day * 365 days/year = 3,679,200
Sanitary water	780,000	Calculated based on 125 people generating 25 gallons/day, 250 days per year. 125 *25 *250 = 781,250 gallons.
Other miscellaneous uses	223,000	Calculated by difference: 9,733,000 - 983,000 -110,000 - 310,000 - 37,000 - 24,000 - 1,900,000 - 66,000 - 1,600,000 - 780,000 - 3,700,000 = 223,000
TOTAL	9,733,000	From monthly meter readings, April 2003 to March 2004

Monthly Water Use Data



Monthly Water Use by Meter - 100 cubic feet						
Month	128690 4"	128710 1.5"	128720 2"	128770 2"	455-380 ¾"	Total
Apr-03	811	1	7	51	9	879
May-03	26	2	3	150	3	184
Jun-03	1651	1	3	288	32	1975
Jul-03	1006	4	1	255	91	1357
Aug-03	1380	8	0	377	160	1925
Sep-03	1161	2	1	317	133	1614
Oct-03	847	3	2	208	99	1159
Nov-03	743	2	2	42	0	789
Dec-03	697	4	3	44	1	749
Jan-04	801	6	3	35	4	849
Feb-04	665	11	4	29	16	725
Mar-04	645	9	3	87	63	807